

Claims

1. (Currently amended) A compound according to the formula $\text{La}_{1-x}(\text{M}, \text{M}')_x\text{Sc}_3(\text{BO}_3)_4$ where x is greater than ~~from about~~ zero ~~[[to]]~~ and less than ~~[[about]]~~ one, and M and M' are selected from the group consisting of ~~La, Pr~~, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, ~~[[Sc]]~~ and Y.

2. (Original) The compound according to claim 1 having nonlinear optical properties.

3. (Original) The compound according to claim 1 where M and M' are independently selected from the group consisting of Yb, Pr, Lu, and Y.

Claim 4 (Canceled)

Claim 5 (Canceled)

6. (Currently amended) ~~[[The]]~~ A compound ~~according to claim 1 where M_x is La, and the compound further satisfies~~ satisfying the formula $\text{La}_x\text{M}_y\text{Sc}_z(\text{BO}_3)_4$ where each of x, y, and z is greater than zero, x, y and z sum to about four, and ~~M_y is selected from the group consisting of rare earth metals if y is greater than 0.3, or is selected from the group of rare earth metals other than Nd, including La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Sc and Y and~~ M_y is selected from the group consisting of Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and Y.

7. (Original) The compound according to claim 6 where M_y is selected from the group consisting of Y, Lu, Yb, and combinations thereof.

8. (Original) The compound according to claim 6 having a formula $\text{La}_1\text{-}_x\text{Y}_x\text{Sc}_3(\text{BO}_3)_4$ where x is greater than zero and less than one.
9. (Currently amended) ~~The compound according to claim 8~~ A compound according to the formula $\text{La}_{1-x}\text{Y}_x\text{Sc}_3(\text{BO}_3)_4$ where x varies from about 0.2 to about 0.4.
10. (Currently amended) The compound according to ~~claim 8~~ claim 9 where x varies from about 0.25 to about 0.35.
11. (Original) The compound according to claim 1 crystallized in the R32 space group.
12. (Original) The compound according to claim 1 further satisfying the formula $\text{La}_{1-x}(\text{M}, \text{M}')_x\text{Sc}_3(\text{BO}_3)_4$ where x is greater than zero and less than one, and M and M' are independently selected from the group of rare earth metals.
13. (Original) The compound according to claim 12 where M and M' are independently selected from the group consisting of La, Pr, Gd, Dy, Ho, Er, Yb, Lu, Sc and Y.
14. (Original) The compound according to claim 12 where M and M' are independently selected from the group consisting of Yb, Pr, Lu, and Y.
15. (Original) A nonlinear optical material according to the formula $\text{La}_x\text{M}_y\text{Sc}_z(\text{BO}_3)_4$, where x, y, and z are greater than 0 and sum to about 4, and M_y is selected from the group consisting Y, Lu, Yb, and combinations thereof.
16. (Original) The nonlinear optical material according to claim 15 where x is from about 0.7 to about 0.8.
17. (Original) The nonlinear optical material according to claim 15 where the material crystallizes in the space group R32.

18. (Original) A nonlinear optical material, $\text{La}_{0.7}\text{Y}_{0.3}\text{Sc}_3(\text{BO}_3)_4$.
19. (Original) A composition, comprising:
a first material according to the formula $\text{M}_x\text{M}'_y\text{Sc}_z(\text{BO}_3)_4$, where x, y, and z sum to about four, and M and M' are selected from the group consisting of La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Sc and Y; and
a second material.
20. (Original) The composition according to claim 19 where each of x, y, and z is greater than zero.
21. (Original) The composition according to claim 19 where the first material is operatively coupled to the second material.
22. (Original) The composition according to claim 19 where the first material is joined to the second material.
23. (Original) The composition according to claim 19 where the second material is a laser material or a nonlinear optical material.
24. (Original) The composition according to claim 19 where the second material also satisfies the formula $\text{M}_x\text{M}'_y\text{Sc}_z(\text{BO}_3)_4$, where M and M' independently are selected from the group consisting of the rare earth metals, x, y, and z are greater than zero, and x, y, and z sum to about four.
25. (Original) The composition according to claim 19 where M_x is La, and the compound further satisfies the formula $\text{La}_x\text{M}_y\text{Sc}_z(\text{BO}_3)_4$ where each of x, y, and z is greater than zero, x, y and z sum to about four, and M_y is selected from the group consisting of rare earth metals.
26. (Original) The composition according to claim 25 where y is greater than 0.3.

27. (Original) The composition according to claim 25 where M_y is selected from the group consisting of La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Sc and Y.

28. (Original) The composition according to claim 19 where the first material satisfies formula $La_{1-x}Y_xSc_3(BO_3)_4$ where x is greater than zero and less than one.

29. (Currently amended) ~~[[The]] A composition according to claim 28~~ comprising a first material of the formula $La_{1-x}Y_xSc_3(BO_3)_4$ where x varies from about 0.2 to about 0.4; and a second material.

30. (Currently amended) The composition according to ~~claim 28~~ claim 29 where x varies from about 0.25 to about 0.35.

31. (Original) The composition according to claim 19 where the first material is crystallized in the R32 space group.

Claim 32 (Canceled)

33. (Original) A device for generating high energy UV light, comprising:
a laser; and

a nonlinear optical material having the formula $M_xM'_ySc_z(BO_3)_4$ where x, y, and z sum to about four, and M and M' are selected from the group consisting of rare earth metals.

34. (Original) The device according to claim 33 where x, y and z each is greater than zero.

35. (Original) The device according to claim 33 where, with reference to the nonlinear optical material, M_x is La, and the compound further satisfies the formula $La_xM_ySc_z(BO_3)_4$ where each of x, y, and z is greater than zero, x, y and z sum to about four, and M_y is selected from the group consisting of rare earth metals.

36. (Original) The device according to claim 35 where y is greater than 0.3.

37. (Original) The device according to claim 35 where M_y is selected from the group of rare earth metals other than Nd, including La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Sc and Y.

38. (Original) The device according to claim 33 having a formula $La_{1-x}Y_xSc_3(BO_3)_4$ where x is greater than zero and less than one.

39. (Currently amended) ~~The device according to claim 38~~ A device for generating high energy UV light, comprising:
a laser; and
a nonlinear optical material having the formula $La_{1-x}Y_xSc_3(BO_3)_4$ where x varies from about 0.2 to about 0.4.

40. (Currently amended) ~~The device compound according to claim 38~~ according to claim 39, where x varies from about 0.25 to about 0.35.

41. (Original) The device according to claim 33 where the material is crystallized in the R32 space group.

42. (Original) The device according to claim 33 where the material further satisfies the formula $La_{1-x}(M,M')_xSc_3(BO_3)_4$ where x is greater than zero and less than one, and M and M' are independently selected from the group of rare earth metals.

43. (Original) The device according to claim 42 where M and M' are independently selected from the group consisting of La, Pr, Gd, Dy, Ho, Er, Yb, Lu, Sc and Y.

44. (Original) The device according to claim 42 where M and M' are independently selected from the group consisting of Y, Pr, Gd, Yb and Lu.

45. (Currently amended) The device according to claim 33 where the material has a formula $\text{La}_x\text{M}_y\text{Sc}_z(\text{BO}_3)_4$, where x, y, and z are greater than 0 and sum to about four, and M_y is selected from the group consisting Y, Lu, Yb, and combinations thereof.

46. (Original) The device according to claim 45 where x is from about 0.7 to about 0.8.

47. (Original) The nonlinear optical material according to claim 45 where the material crystallizes in the space group R32.

48. (Currently amended) The device according to ~~claim 33~~ claim 39 where the nonlinear optical material is $\text{La}_{0.7}\text{Y}_{0.3}\text{Sc}_3(\text{BO}_3)_4$.

Claims 49–59 (Canceled)

60. (Previously presented) The compound of claim 1, according to the formula $\text{M}_x\text{M}'_y\text{Sc}_3(\text{BO}_3)_4$, where x and y sum to about one, and M and M' are selected from the group consisting of La, Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Sc and Y.

61. (New) A compound satisfying the formula $\text{La}_x\text{M}_y\text{Sc}_z(\text{BO}_3)_4$ where each of x, y, and z is greater than zero, x, y and z sum to about four, and y is greater than about 0.2, and M_y is selected from the group consisting of Pr, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and Y.

62. (New) The compound of claim 62, wherein y is from about 0.2 to about 0.4.

63. (New) The composition of claim 19, wherein y is greater than about 0.2.

64. (New) The method of claim 37, wherein y is greater than about 0.2.